EXHIBIT C

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA

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THE CITY OF HUNTINGTON,

Plaintiff,

vs. CIVIL ACTION
NO. 3:17-01362

AMERISOURCEBERGEN DRUG CORPORATION, et al.,

Defendants.

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CABELL COUNTY COMMISSION,

Plaintiff,

vs. CIVIL ACTION
NO. 3:17-01665

AMERISOURCEBERGEN DRUG CORPORATION, et al.,

Defendants.

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Videotaped and videoconference deposition of KATHERINE KEYES taken by the Defendants under the Federal Rules of Civil Procedure in the above-entitled action, pursuant to notice, before Teresa S. Evans, a Registered Merit Reporter, all parties located remotely, on the 15th day of September, 2020.

deaths that you directly attribute to prescription opioids, and the other is those you indirectly attribute. Is that right?

A. That's right.

Q. And you -- you do this based on a review of death certificates? Is that right?

A. In part. That's one of the methodologies used.

Q. What else did you look at aside from death certificates?

A. We also looked at the proportion of people who don't have a prescription op -- well, we look -- among those who don't have a prescription opioid listed on their death certificate, we used the literature to estimate the portion that are indirectly attributable based on inference from the literature.

Q. Where did you get the base data for the information listed on the death certificates?

A. The CDC. The National Vital Statistics system.

Q. And the death certificates list all of the substances found in the body at the time of death. Is that right?

A. They list the substances contributing to the death, I believe.

Q. Is it substances contributing to the death or substances found in the body?

A. Based on the T codes that I used, I believe that they are contributing to the death.

Q. And that judgment is made by whom?

A. Usually a medical examiner.

Q. And so there can be circumstances where somebody at the time of death has multiple drugs in their body and -- first of all, let me ask you that. I take it that's true, right? At the time of death, you could have people with multiple drugs in their body?

A. That's right.

Q. And there are occasions where the medical examiner lists the factors that contribute to death as more than one drug?

A. That's right.

Q. And your judgment and your methodology was that if -- if prescription opioids were listed as one of the contributing factors, you directly attributed the death to prescription opioids even if there were other drugs also identified as

contributing causes?

A. That's right.

Q. And so you could have somebody who had a mix of substances that was 99 percent fentanyl and 1 percent prescription opioid at the time of death. Right?

MR. ARBITBLIT: Objection. .

Q. I'm saying 99 and 1 percent as a fraction of the drugs in their body.

MR. ARBITBLIT: Objection.

A. That's a hypothetical. I haven't seen data from the Hunt -- Cabell/Huntington community that would list the percentages of each drug that were --

Q. I'll agree. Maybe I'll ask it a different way that may be better.

So you could have a circumstance where the medical examiner identifies fentanyl and prescription opioid as contributing causes of death, right?

A. That's correct.

Q. And the medical examiner doesn't list which one is primary or which one is secondary, right?

MR. ARBITBLIT: Objection.

A. Yeah, in that example, it -- if the fentanyl was in a prescription pill, then both were necessary for the death.

Q. Well, I was just asking about fentanyl -- let's talk about illicit fentanyl, illegal fentanyl. And --

MR. ARBITBLIT: Sorry.

Q. -- after 2015 or so, you're aware that there has been a significant spike in illegal fentanyl use in Cabell/Huntington?

A. Yes.

Q. And so let's -- I just wanted -- it is hypothetical, but to help illustrate what we're talking about, you could have a death certificate that lists fentanyl and heroin as causes of death in the -- without the medical examiner deciding which was primary and which was secondary. Correct?

MR. ARBITBLIT: Objection.

A. Based on the T codes, you know, I think the T codes are all just listed as contributing causes. The idea is that they interact with each other, so that each one was necessary for the death to occur.

Q. And --

taken together. So again, I would say that the person would not have taken fentanyl had the prescription opioid not been there.

Do you know what I'm saying? So I would say when the prescription opioid is listed as a cause of death, it's a reliable methodology to consider it a cause of death.

Q. Well, when you -- when you talk about "cause" in this -- in this circumstance, you're not talking about sole cause or the only cause. You're talking about one among potentially a number of causes. Correct?

MR. ARBITBLIT: Objection.

A. The definition of "cause" is a factor without which the outcome would not have occurred.

Q. So --

A. So there could be multiple causes.

Q. There could be multiple causes for a certain event, correct?

A. There can be multiple causes, but it's not a cause unless the outcome would not have occurred without it.

Q. But the medical examiner doesn't decide whether an outcome would have occurred without the

A. That's right.
Q. And do you believe that's because of any relevant time period in the Dowell paper?
A. -- the paper --
Q. Well, let me ask this -- if the Dowell paper had the same statistics through 2018, would you have stopped at 2015?
A. Yeah.
MR. ARBITBLIT: Objection.
Q. You would have?
A. I would have stopped at 2015. That was the relevant time period I was interested in. The 2011 to 2015 time period. Because that covers the direct pre- and post-fentanyl introduction. And so that small window was the correct window to estimate the factor of three.
If you went through 2018, you would get a much bigger factor, but that wouldn't be relevant to the multiplier that I was interested in.
Q. It wouldn't be relevant?
A. Correct.
Q. Did you -- did you consider applying your multiplier based on data through 2018?
A. I considered it and rejected it as

didn't do that.

Q. And again, that's because you're assuming there were not any changes in what was causing the increased mortality over that period of time. Correct?

MR. ARBITBLIT: Objection.

A. I am assuming that the contribution of synthetic opioids in terms of the percentage increase in drug overdose death was similar after 2015 than pre-- 2013, essentially.

Q. Have there been any changes since 2015 in the ways in which illicit fentanyl is -- is sold on the streets or the forms in which it appears?

A. Can you give an example of that?

Q. Sure. An example would be -- you testified, I think, earlier fentanyl being available as an adulterant in heroin. Are you aware that there are also prescription -- sorry, excuse me.

-- that there are counterfeit prescription pills made to resemble a prescription opioid that are often laced with fentanyl and cause death?

A. I am aware that there are counterfeit

prescription opioids and that some of them have fentanyl in them.

Q. And are you aware that people have overdosed and died from pills like that?

A. Yes, I have -- I'm aware that that occurs.

Q. In forming your conservative estimate of the OUD population in Cabell/Huntington, did you investigate whether or not these types of counterfeit pills were more -- more available after 2015 than they were in 2015?

A. Again, that -- that wouldn't change my estimate if they were more available versus less available, as long as the pre/post fentanyl introduction multiplier is -- is the accurate multiplier, which is the one that I've used.

So because there are more fentanyl deaths, what matters in terms of the validity of the estimation, is the probability of death per use.

Q. And is carfentanil more potent than what was generally referred to as synthetic fentanyl when fentanyl first appeared?

A. I would need to look at -- there are a number of different synthetic opioids. I was

assuming kind of an average of them.

Q. Okay. Well, I've already asked whether you know if carfentanil is -- is present and available in 2015. But my question more specifically was: Do you know whether or not carfentanil is more potent and therefore considered more dangerous than other synthetic fentanyls?

A. I would have to look at the range of all synthetic fentanyls. Carfentanil is very potent. But you know, if you want to show me some data on the potency of various synthetic opioids, I can answer your question. But just carfentanil compared to a random synthetic opioid, I don't have -- I can't -- that's not sufficiently specific to answer your question.

Q. Okay. Can you open -- let me just make sure I have the number correct.

-- Exhibit 86?

KEYES DEPOSITION EXHIBIT NO. 86

("Underlying Factors in Drug Overdose Deaths" by Dowell, et al. dated 12-19-17 was marked for identification purposes as Keyes Deposition Exhibit No. 86.)

A. Can you ask your question again?

Q. Sure. You had told me that the reason you stuck with 2015 deaths per 100,000 even though you knew that there were higher estimates for later years and even though you fully understand that using those higher estimates would reduce your OUD population, that the reason for that is you wanted to have a multiplier to capture the period of the year before and after the change.

So my question was: If there were further changes in the availability, the potency, the number of ways in which it appeared, the transparency with which it appeared, if any or all of those things changed subsequent to 2015, would your multiplier really be picking up, as you put it, the change?

MR. ARBITBLIT: Objection, vague, ambiguous, argumentative, compound, asked and answered.

A. No. That's the short answer to your question, is no. The correct calculation would be 2011 to 2015 because the calculation is not capturing -- the purpose of the calculation is not to capture the change from one time to another;

it's to estimate the change in the probability of drug overdose death, given a change in the underlying death rate.

And so the appropriate way to calculate that using the methodology that is reliable in my field would be to use a pre/post comparison in an interrupted time series, which is what I did.

If there are further changes after 2015, it would be biased to include that as part of my interrupted time series.

So the way you are describing the methodology would be incorrect. The way I'm describing the methodology is correct under the reliable methods of my field.

Q. So let me just make sure I understand that. If there were further changes in how dangerous illicit fentanyl was as measured by the number of deaths it caused per 100,000, that would not be relevant to your estimate of the OUD population based upon the number of deaths attributed to fentanyl?

MR. ARBITBLIT: Objection.

A. I don't know how to describe this methodology again. Changes in --

Q. Doctor Keyes, did you perform your own calculations in this matter?

A. I worked with my research assistant.

Q. Did you review the calculations that were performed in this matter?

A. I did.

Q. Do you have a working understanding of how the calculations were performed?

A. No, to be honest with you, I don't. If there's a specific subtraction that -- in a specific column of one specific Excel spreadsheet -- I performed a lot of analyses to come up with these estimates, and I would need to see what specifically you're referring to.

Q. Well, I'd be happy to provide it, I'm not trying to do it by ambush. I knew that there were a lot of exhibits that had been -- had been sent out. I wasn't aware until today that this Excel spreadsheet was not one of them.

If you'd like, I can e-mail the spreadsheet. But I'm asking you about what was disclosed to us as your -- your backup Excel file, with your calculations, and I just -- I have some questions --

that to you. If you're going to complain about me offering to do that, I won't send it to you and I'll continue asking my questions.

MR. ARBITBLIT: You can ask your questions, but the witness is within her rights not to be able to not answer them without seeing what you're talking about.

MR. METZ: Okay, you and I have a different view about what experts can be asked about.

MR. ARBITBLIT: I didn't say you couldn't ask.

BY MR. METZ:

Q. Doctor Keyes, do you have a working knowledge of the calculations that you produced for your Figure 8, how they were put together?

A. Yes.

Q. Does that calculation at any point include a -- the creation of a percentage that is the percentage of deaths coded T40.4 as a share of deaths coded T40.2, T40.3 and T40.4 combined. Yes or no.

MR. ARBITBLIT: Objection.

A. The Figure 8?

Q. Yes.
A. So what we did for Figure 8 was T40.2, T40.3 and a portion of T40.4.
Q. Do you know how you arrived at the portion?
A. Yes, I do.
Q. How did you arrive at the portion?
A. We estimated the pre-illicit fentanyl share of prescription opioid overdose deaths that were due to T40.4 and applied that share thereafter. I attributed those deaths to prescription opioids.
Q. Okay. In coming up with that share, are deaths that are coded T40.4, are they exclusive of -- that same death can't appear as T40.2 or T40.3, can it?
MR. ARBITBLIT: Objection.
A. That's right.
Q. Okay. And so getting back to the question I was trying to ask before, you've described the default rule that you would use if T40.2 or T40.3 was present, you would code that death as one or the other of those.
But my question was: If they are not present, you only have T40.1 and you only have T40.4. Did you have a default rule that you

applied as to which way that death would be coded the one time that it's coded?

MR. ARBITBLIT: Objection.

A. T40.4 is not in Figure 8. That's what I'm confused about.

Q. Well --

A. I mean, T40.1 is not in Figure 8.

Q. Right.

A. So if it's coded T40.1 and T40.4, it's coded T40.4, so the same rule that's described in the report was applied.

Q. Okay. And you have a Figure 16, correct?

A. Do you want me to go to Figure 16?

Q. I'm asking, do you know that you have a Figure 16?

A. I do know that I have a Figure 16.

Q. Okay. Does the calculation that produces your Figure 16 include T40.1?

A. Yes, Figure 16 does include T40.1.

Q. Okay. So just going back to my prior answer -- my prior question: For purposes of your Figure 16, when you were deciding whether something belonged in the bucket of T40.1 versus T40.4, if both were present - which again, there is a

circumstance in which there was heroin and fentanyl both present - did you have a default rule that you used in order to decide whether that death would be coded as fentanyl versus coded as heroin?

A. I would need to look at the spreadsheet to know exactly what mathematical formula that we applied.

Q. Okay. I don't believe that information is available in the spreadsheet. So my question is simply: As you sit here, you do not know whether a death certificate that was coded as both heroin and fentanyl, whether that - for purposes of your analytics - was listed as a heroin death or a fentanyl death?

A. I believe I've been very transparent with my methodology, so if a -- if a death has T40.1 and T40.4, then the share of the T40.4 deaths that were the pre-2013 deaths would be applied to that. That death could only be -- that death could be considered directly or indirectly attributable to prescription opioids based on a proportionate share from the pre-2013 T40.4 deaths.

So it's -- I think the question is a little bit too simplistic of which bucket did T40.1

and T40.4 deaths go, because it was based on this mathematical calculation.

Q. Is that true, what you just told me, for time periods prior to 2012?

MR. ARBITBLIT: Objection.

A. Prior to 20 -- prior to 2012, T40.4 deaths were considered prescription opioid deaths.

Q. And if it was a T40.1 and a T40.4 both present, you would call that a T40.4 death, a fentanyl death, rather than a heroin death. Is that fair?

MR. ARBITBLIT: Objection.

A. I didn't call anything a fentanyl death. I attributed that death to prescription opioids.

Q. Well, but specifically for purposes of your calculation, you attributed it as a T40.4; is that right?

MR. ARBITBLIT: Objection.

A. I --

MR. ARBITBLIT: Vague.

A. I didn't do that. I didn't attribute anything to T40.4. I attributed things to prescription opioids or not prescription opioids.

Q. Okay. I'll move on.

Now, you've described for purposes of calculating your Figure 8 that that is the before 2013 share of overdose deaths that was attributable to -- to -- to what you would understand to be prescription fentanyl. Is that a fair summation of what Figure 8 represents?

A. I considered T40.4 deaths to be prescription opioid deaths prior to 2013.

Q. Okay. And sorry I wasn't clear. So then for 2013 forward, you've not just been able to take the total that is coded T40.4 because you understand some number of those are illicit fentanyl deaths, they're not prescription fentanyl deaths, right?

A. That's right.

Q. Sorry, I couldn't hear you. Was that a yes?

A. Yes, that's right. That's right.

Q. And so you were starting to describe this calculation that you perform in order to attribute going forward some number of those -- that T40.4 category to -- to prescription opioids, and so my questions are going to relate to that. I want to understand better the logic of the calculation.

A. Sure.

Q. So when you calc -- first of all, is it correct that in order to come up with the share that you're attributing to prescription fentanyl, your first step is to calculate a ratio of T40.4 deaths as a function of T40.2, T40.3 and T40.4 combined.

A. That's right. .

Q. And --

A. Wait, I'm sorry, actually, I don't think that's quite right. I would have to look at the spreadsheet. I'm sorry. I think that we did some manipulation to the -- to account for deaths that had T40.2 and T40.3 as well as T40.4, so I don't think the way you've described it as exactly what we did.

Q. Okay. If you'll accept -- well, let me just ask it a different way. However you would more precisely phrase that, there is a step in your calculation in which you come up with a percentage that T40.4 represented as a function of some other prescription opioids. You may have made some adjustment to it.

But isn't that correct, that that is

one step in your calculation?
A. Yes.
Q. Is that correct?
A. That's correct.
Q. Okay. And if it would help -- I think this is described in text on page 33 of your report --
A. Yeah, I was referring to that.
Q. -- where you say -- right, "I estimated the rate of synthetic opioid deaths from 1999 to 2012, and applied that rate to synthetic opioids over those deaths from 2013 and onwards as a estimate of the number of synthetic" "deaths." Correct?
A. That's correct.
Q. Okay. So then when you -- and do you recall -- do you recall what that rate was, approximately?
MR. ARBITBLIT: Objection.
A. Not off the top of my head.
Q. Okay. Off the top of your head, do you know whether in calculating that rate you took a weighted average of the deaths?
A. I considered doing a year-to-year average, but the numbers were unreliable for on a year-to-year basis, and so I summed the total

period from 1999 to 2012 to get a more statistically reliable estimate.

Q. It's more statistically reliable to sum all the deaths and then take the percentage, correct?

MR. ARBITBLIT: Objection.

Q. Maybe I misunderstood. I just wanted to make sure I understood correctly what you said you did to get a more reliable estimate.

A. Maybe you could be more clear what you mean by a "weighted average."

Q. Yeah, all I meant was to calculate what you described in your -- the text of your report as a rate, you took -- you formed that rate as a function of all deaths from 1999 through 2012 rather than doing it, as you described, year by year. Is that fair?

A. (Nodded affirmatively).

Q. Okay. And that approach is taking them all together, as opposed to doing it year by year, I think you just testified that's the more reliable way to do that, correct?

A. I did it both ways, and it didn't make a difference in my final calculation, and I felt that the overall period provided a more reliable

estimate.

Q. Yeah. Would it surprise you to know that in fact you did the opposite?

A. I'm sorry, I -- I'm not understanding.

Q. Okay. Now, you then used this rate that you calculated to estimate going forward the number of deaths coded as T40.4 that are -- that continue to be attributable to prescription opioids, in your opinion. Is that correct?

A. As an estimate, yes.

Q. Okay. And you do that for the years 2013 through 2018; is that right?

A. That's right.

Q. And explain to me why -- or how is the rate of -- at which prescription opioids -- the rate that that made up of all -- sorry, back this up.

Explain to me how the percentage share of prescription opioid deaths that was attributable to prescription fentanyl prior to 2012, how that statistic in any way predictive of the share of T40.4 deaths, so synthetic only, that were the result of prescription fentanyl.

Can you explain the logic of that to me?

A. Sure. Well, to back up, I did the calculations several ways, including estimating post-2013, using the same sort of denominator, if you will, of all prescription opioid deaths that were T40.4 and estimated that as a function of the number that would potentially be attributable to prescription opioids, and then estimated the total number of T40.4 deaths - which is the number of deaths that I was interested - how many of those would be attributable to prescription opioids, and the results were similar no matter how you applied that estimate post-2013, but my interest was in the fentanyl deaths, and so I applied the percentage to the -- to the fentanyl deaths specifically, because those are the deaths that I was interested in identifying an estimate of the number that would be due to prescriptions.

Q. But how -- given the manner in which you calculated the percentage, how was it informative of the share of T40.4 deaths that are prescription fentanyl versus illicit fentanyl? Is it your testimony that the ratio you calculated is somehow informative of that question? And if so, how?

A. So as an example, if prior to 2013 there

were 100 prescription opioid deaths and two of them were prescription fentanyl deaths, if there were 100 fentanyl deaths after 2013, I would estimate that two of those would be prescription fentanyl deaths.

Q. And if there were 400 fentanyl deaths, you would -- you would estimate that eight were prescription fentanyl, correct?

A. I'm sorry?

Q. Under that same logic you just described, if there were 400 prescription fentanyl deaths, you -- your logic would lead you to conclude to eight were the result of prescription deaths.

A. Using that calculation, that would be the -- that would be the estimate.

Q. Okay. And if there were -- and if we doubled the number of deaths again, solely within the category of synthetic -- synthetic opioids, you would continue to calculate that that ratio would hold, no matter --

A. Yes.

Q. -- how many additional deaths there were --

A. It stays the same.

Q. -- a certain percentage will always be the

result of prescription opioids versus illicit -- prescription fentanyl versus illicit fentanyl?

A. It's a relatively moot point, because I did it a number of different ways, and the results were robust to the type of correction that you did.

But I applied the correction to the T40.4 deaths overall.

Q. What sensitivity tests did you perform on this calculation?

A. As I mentioned, I looked at the T40.4 deaths as a function of overall prescription opioid deaths as well.

Q. Are you relying on that calculation for the robustness that you just testified to?

A. I don't -- I guess I don't understand what you mean by that.

Q. Well, that calculation hasn't been disclosed to us, so my question is: Are you relying on that for purposes of what you just explained was your belief that this is a -- the issue I'm describing -- discussing doesn't matter because you got the same results no matter how you did it so --

A. So --

Q. -- are you relying on that other calculation to support that statement?

A. In the course of due diligence in epidemiology, we routinely do a range of different sensitivity analyses on the robustness of our results. That's just what we do in the course of our calculations.

So I rely on the estimate that I provided in the report, and I also - because I'm an epidemiologist - I tested the robustness of it using multiple different approaches.

Q. And did you retain --

A. So I --

Q. And did you retain those robustness and sensitivity analyses?

A. We were -- I'm sure I did.

Q. And have they been produced to the defendants in this litigation?

A. I was asked to produce the calculations that went into the report. I routinely do sensitivity analyses on my estimates. So no, I have not produced the sensitivity analyses.

Q. Okay. Back to my original question: How is the rate at which T40.4 was present among T40.2,

T40.3 and T40.4, how does that rate inform at all the question of how much of T40.4 is then made up of prescription fentanyl versus illicit fentanyl?

How is the one informative of the other?

A. I would answer it the same way as when you previously asked it: That that is the population that we're interested in estimating this percentage within, and that's routinely done in epidemiology.

Q. Well, I understand that that's the question you want to answer. But why does that ratio provide you that answer?

MR. ARBITBLIT: Objection, argumentative, asked and answered.

A. I think I've explained it. It's the T40 -- the T40.4 deaths, we wanted the share of those that were due to prescription opioids. We knew the share of prescription opioid deaths that were due to fentanyl in a prior period, and so applied that share to the T40.4 deaths, which was the subgroup that we were specifically interested in.

Q. And -- but you understand that after 2013 that the subgroup of prescription fentanyl and illicit fentanyl -- you understand that, correct?

A. I understand that T40.4 is synthetic opioid death.

Q. And that after 2013, it's inclusive of illicit fentanyl as well as you assumed some prescription fentanyl. Correct?

A. I would say synthetic opioids. But yes, it's going to be a mix of illicit and licit.

Q. And it's your testimony, as a reasonable epidemiologist, that you can look at the population at which prescription fentanyl was present, among other prescription opioids, and that will tell you how much prescription fentanyl was present among prescription fentanyl and illicit fentanyl. That's your testimony?

A. That's one way to estimate that portion. I did it a number of different ways. None of them made a difference in terms of my opinion or materially to the calculation, and I think it's routine in epidemiology to, for example, apply an estimate of risk to the subgroup at risk to try to get an estimate of the total number.

Q. Is it routine in epidemiology to have a hypothesis in mind when using statistical analysis, as to how one number might be determinative of some

other number? Is that routine?

MR. ARBITBLIT: Objection.

A. I'm not understanding what the question means. To have a hypothesis -- what do you mean by "a hypothesis"?

Q. Do you ever use the term "hypothesis" in connection with statistical analysis?

A. I do.

Q. And what do you use it to mean?

A. I would hypothesize that prescription opioid use causes heroin use, for example. It's usually -- a hypothesis is about a cause or a causal connection.

Q. And is it important to have a hypothesis when interpreting statistical information? To then base further conclusions on.

MR. ARBITBLIT: Objection.

A. I wouldn't make a blanket statement like that.

Q. Okay. Would you agree or disagree with the statement that "One must infer that a causal relationship exists on the basis of an underlying causal theory that explains the relationship between two variables?"

MR. ARBITBLIT: Objection.

Q. Would you agree with that as a blanket statement?

MR. ARBITBLIT: Objection.

A. No, I wouldn't agree with that as a blanket statement.

Q. And certainly that's not consistent with the principles you applied in performing this calculation, right?

MR. ARBITBLIT: Objection.

A. I don't --

MR. ARBITBLIT: Vague.

A. It's not consistent or inconsistent. I don't see the relevance.

Q. Back to your calculation that you used to produce Figure 8 - and also, then, therefore Figure 16 - am I correct that you used West Virginia statewide death totals as the basis for the calculation that you performed?

A. For the West Virginia rates, yes.

Q. Well, and am I correct that you then applied that West Virginia rate to -- within Cabell and Huntington, but you didn't estimate a separate Cabell and Huntington rate, correct?

A. For the death rates, we had data on Cabell for a number of years.

Q. Right. I'm just asking you if you used it for purposes of calculating the rate that you attributed to prescription fentanyl. Is that how you performed the calculation?

A. Can you just be specific about what rate you mean? Because there's a lot of rates in Figure 8.

Q. The rates we've been talking about that are discussed at page 33 of your report. It's the rate of prescription fentanyl and the share of other prescription opioids.

A. Yes.

Q. Do you recall whether you calculated that rate on the basis of West Virginia-specific data or Cabell and -- Cabell County-specific data?

A. I would need to look at the spreadsheet.

Q. Okay. Sticking with the West Virginia piece of it, do you recall approximately how many deaths you attributed to prescription -- to prescription fentanyl in the last year for which you were using actual data, not estimated data? Do you recall approximately how many deaths that was?

A. No.
Q. Would you believe me if I told you that in the West Virginia portion of your calculation, you -- for 2012, you had 41 deaths?
A. I really would need to see the -- the spreadsheet.
Q. That's fine. You can treat this as a hypothetical. I am asking about your calculation, but if you want to treat it as a hypothetical, be my guest. I'd like you to assume that for 2012, you had 41 deaths in that category, and then you begin projecting --
A. Could you just slow down a minute? Which category? The 20 -- 2012 -- I'm sorry, just go a little bit slowly so I can keep up.
Q. No problem. 2012, the deaths that had only T40.4 as a contributing opioid. Okay? You with me? The death that you --
A. So 2012 -- I'm assuming a hypothetical that in 2012, there were 41 deaths with T40.4 --
Q. Correct.
A. -- only. No other T codes.
Q. Well, you've told us a little bit how you've categorized things. But that's the number

represented in -- we'll call it hypothetically. But that's in Column J, Row 36 of your calculations, as deaths that had only T40.4 as a contributing opioid, is how you describe it there.

A. I find it very difficult to follow this when I'm not allowed to see the spreadsheet.

Q. You're more than allowed. I offered to provide it. Your counsel complained about that offer, and so I've not provided it. If you'd like me to provide it, I'd be willing to provide it right now. I suspect Mr. Arbitblit will just complain again.

So you can have it one way or the other, but you can't have it both ways.

A. This is difficult to --

Q. That's fine. Why don't I continue my question. I would like for you to assume for 2012, the deaths that you attributed to prescription fentanyl --

MS. DO AMARAL: I'm sorry, Counsel, can we take a moment? I don't see that Mr. Arbitblit is still on --

MR. ARBITBLIT: I'm still on.

MS. DO AMARAL: We need to stop the

deposition for a minute? Can we take a few minutes?

MR. ARBITBLIT: No, no, no, no I'm still on.

MS. DO AMARAL: I'm sorry, Don, I didn't see you:

MR. ARBITBLIT: I am still on.

Q. Okay, let me ask this again. For the last year for which you had actual data, you had 41 deaths in the category of T40.4 as the contributing opioid, that's the prescription fentanyl. Okay?

A. I had actual data on all years.

Q. Well, you don't for 2013 and 20-- I'm using data in contrast to the years for which you provided an estimate of the T40.4. Do you understand my meaning now?

A. Sure.

Q. Okay. For the last year for which you only used actual data, no estimated or projection, there were 41 deaths in that category. Do you recall approximately how many deaths your estimate put in that category for the year 2017?

MR. ARBITBLIT: Objection.

A. No.

Q. You do not recall?
A. No.
Q. If -- I'll ask you just to assume, as a hypothetical - but for the record, this is in Column J, Row 41 - it's 491 deaths. So it's 450 more than in the last year for which you were using data alone rather than a projection.
My question is --
A. I don't know that that's accurate.
Q. Well, I -- you can fight me on whether or not it's accurate. I'm staring it at in the face. I'd be happy to show it to you. But if you don't believe me, take it as a hypothetical, and then answer this question:
Do you have a theory that would explain why prescription fentanyl went from killing 41 people in 2012 to killing 491 people five years later? Do you have a theory as to why that would be the case?
A. Prescription overdose deaths are -- overdose deaths are going up overall, so I would need to look at the specific underlying data in order to answer that question.
Q. Do you know whether the availability of

prescription fentanyl specifically increased or decreased over that time period?

A. It decreased slightly.

Q. Okay. Do you know whether the potency of prescription fentanyl increased, decreased or stayed the same over that time period?

A. I don't know.

Q. And at least under your calculation, prescription fentanyl specifically was present in ten times as many overdose deaths as a result of your projection and --

A. Again, I did the projections several different ways.

Q. And my question is: If it's not because there was more prescription fentanyl available and if it's not because prescription fentanyl was more potent all the sudden, is there a theory that would explain why prescription fentanyl specifically was now causing 12 times as many deaths as before per year?

A. I am not offering any opinions with respect to that. My only opinion is that the reliability of my estimates was verified as much as I could. And so this is the most reasonable and reliable

approach that I could -- that I decided to use.

Q. And some of those methods that you've just described, validating the reliability of your analysis, you performed additional statistical calculations that lead you to that conclusion, correct?

A. Yes. Routinely we perform many different statistical calculations when we're estimating trends like this.

Q. Now, earlier today you made reference to a study that you refer to as the Allen paper? Do you recall that?

A. I do.

Q. I just want to confirm. Is the title of that paper "Estimating the number of people who inject drugs in a rural county in Appalachia?"

A. Is it -- is it one of the exhibits?

Q. It is not one of the exhibits. Do you recall that title?

A. Yeah, I think that that's the title.

Q. Okay. Do you recall whether one of the co-authors of the paper was a Michael Kilkenny, who's affiliated or employed by the Cabell-Huntington Health Department?